



**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

**Inventor: Yasuyuki WATANABE, et al.**

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**Application No.: 10/660,761**

**Group Art Unit: 1752**

**Examiner: Walke, Amanda C**

**Title: HEAT-SENSITIVE LITHOGRAPHIC PRINTING PLATE AND IMAGE FORMING METHOD**

**DECLARATION PURSUANT TO 37 C.F.R. 1.132**

**Commissioner for Patents**

**Washington, D.C. 20231**

**Sir:**

**I, Yasuyuki Watanabe, a citizen of Japan, hereby declare and state that**

**1. I obtained a Doctorate in Engineering from Tohoku University, in March 1991. Since April 1991, I have been employed by DAINIPPON INK AND CHEMICALS, INC., and have been engaged in research in the field of speciality chemicals.**

**2. I am one of the inventors of the invention as claimed in the above-referenced application, and accordingly, I am familiar with the specification and claims which comprise that application.**

**3. I am aware of the Office Action of August 8, 2005, issued on the above-referenced application, in which Claims 1-5 and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Neubauer et al. (US 5,328,797).**

**4. As is described in this Declaration, I conducted experiments for the purpose of demonstrating the difference between the layer prepared by the materials described in Neubauer and that of the present invention by measuring the contact angle.**

**1) Sample**

**Samples of Comparative Examples 1 and 2 are prepared using the composition based on Example 4 and 5 of Neubauer in the way hereinafter prescribed. The layers**

having similar components to Examples 4 and 5 used by Neubauer as far as possible are prepared since some compounds used by Neubauer are unavailable on the market.

#### Comparative Example 1

##### Synthesis of a copolymer (1) solution of methyl methacrylate/methacrylic acid (82:18) in 2-butanone

In a 1-liter four-necked flask equipped with a stirrer, a reflux condenser, a nitrogen-introducing tube with a thermometer, and a dropping funnel, 300 g of 2-butanone was charged. After heating to 80°C, under a nitrogen atmosphere while stirring, a mixture of 246 g of methylmethacrylate, 54 g of methacrylic acid and 6 g of 2,2'-azobis(2-methylbutyronitrile) was added dropwise over 3 hours. After adding, stirring was continued for 6 hours to obtain a 53.7% copolymer (1) solution of methyl methacrylate/methacrylic acid (82:18) in 2-butanone having a weight-average molecular weight of 29,000.

##### Preparation of light-sensitive composition

A solution composed of

7.4 g of 53.7 % copolymer (1) solution in 2-butanone,

4.0 g of trimethylolpropane triacrylate (ARONIX M-309, manufactured by Toagosei Co., Ltd.),

0.1 g of 9-methylacridine

0.1 g of 2-methoxyphenyl-4,6-bis-trichloromethyl-s-triazine (MP-triazine, manufactured by Sanwa Chemical Co., Ltd.),

0.04 g of diazonium salt polycondensation product prepared from 3-methoxydiphenyl-amine-4-diazonium sulfate and 4,4'-bis(methoxymethyl)diphenyl ether (Fuji Sensitizer CS-2, manufactured by Fuji Pigment Co., Ltd.),

24 g of diethylene glycol monomethyl ether,

24 g of ethanol,

3.9 g of 2-butanone,

was applied to an aluminum substrate (which has been roughened by brushing with an aqueous abrasive suspension and pretreated with a 0.1%-strength aqueous solution of

polyvinyl phosphonic acid, and is then dried) using a bar coater, and dried at 60°C for 4 minutes to obtain two light-sensitive lithographic printing plates having a 2  $\mu$ m thick light-sensitive layer. After one light-sensitive lithographic printing plate was cut in half, a contact angle of one piece was measured as it is while a contact angle of another piece was measured after heating at 150°C for 3 minutes and cooling.

### Comparative Example 2

#### Synthesis of a copolymer (2) solution

In a 1 liter four-necked flask equipped with a stirrer, a reflux condenser, a nitrogen-introducing tube and a thermometer, 50 g of a polyvinyl butyral (manufactured by Sigma-Aldrich, Inc.) having a molecular weight of about 70,000-100,000, which contains about 80% butyral, 18-20% vinyl alcohol and 0-1.5% vinyl acetate, 4 g of maleic anhydride were charged and dissolved in 725 g of 2-butanone while heating. 1 g of triethylamine was added to the clear solution and the solution was heated at 80°C for five hours under a nitrogen atmosphere. After cooling, the solution was filtered and the added dropwise to 10 L of distilled water, a white fibrous product being obtained which was filtered off by suction and dried in vacuo at 40°C. The product was diluted with 2-butanone, and then 20.0 % of the copolymer (2) solution was obtained.

#### Preparation of light-sensitive composition

A solution composed of

- 0.84 g of 53.7% copolymer (1) solution in 2-butanone,
- 5.25 g of 20 % copolymer (2) solution in 2-butanone,
- 0.45 g of diazonium salt polycondensation product prepared from 3-methoxydiphenyl-amine-4-diazonium sulfate and 4,4'-bis(methoxymethyl)diphenyl ether (Fuji Sensitizer CS-2, manufactured by Fuji Pigment Co., Ltd.),
- 0.04 g of 85% phosphoric acid,
- 0.09 g of Victoria pure blue BO,
- 1.5 g of pentaerythritol triacrylate (ARONIX M-309, manufactured by Toagosei Co., Ltd.),
- 0.007 g of phenylazodiphenylamine
- 0.12 g of 2-methoxyphenyl-4,6-bis-trichloromethyl-s-triazine (MP-triazine, manufactured by Sanwa Chemical Co., Ltd.),
- 24 g of diethylene glycol monoethyl ether,
- 24 g of tetrahydrofuran,
- 43 g of 2-butanone,

was applied to an aluminum substrate (which has been roughened by brushing with an aqueous abrasive suspension and pretreated with a 0.1%-strength aqueous solution of polyvinyl phosphonic acid, and is then dried) using a bar coater, and dried at 60°C for 4 minutes to obtain two light-sensitive lithographic printing plates having a 2  $\mu$ m thick light-sensitive layer. After one light-sensitive lithographic printing plate was cut in half, a contact angle of one piece was measured as it is while a contact angle of another piece was measured after heating at 150°C for 3 minutes and cooling.

## 2) Test method of contact angle

The measuring method is as the same as that described in Example 1 of the present invention.

## 2) Results

### Comparative Example 1

On the layer of Comparative Example 1, an advancing contact angle ( $\theta^a$ ) before heating was 73.3° and a receding contact angle ( $\theta^{b1}$ ) was 56.4°, while a receding contact angle ( $\theta^{b2}$ ) after heating was 56.1° which was less than the receding contact angle ( $\theta^{b1}$ ) before heating. A difference in the receding contact angle before and after heating, ( $\theta^{b2} - \theta^{b1}$ ) was -0.3°, this being smaller than 1° which is claimed in claim 1 of the present invention.

### Comparative Example 2

On the layer of Comparative Example 2, an advancing contact angle ( $\theta^a$ ) before heating was 86.9° and a receding contact angle ( $\theta^{b1}$ ) was 52.0°, while a receding contact angle ( $\theta^{b2}$ ) after heating was 51.8° which was less than the receding contact angle ( $\theta^{b1}$ ) before heating. A difference in the receding contact angle before and after heating, ( $\theta^{b2} - \theta^{b1}$ ) was -0.2°, this being smaller than 1° which is claimed in claim 1 of the present invention.

The contact angles of the layers of the present invention and those of Comparative Examples 1 and 2 of Neubauer are shown in Table 1.

Table 1

	Before heating		After heating	Difference in receding contact angle ( $\theta^{b2} - \theta^{b1}$ )
	Advancing contact angle ( $\theta^{f1}$ )	Receding contact angle ( $\theta^{b1}$ )	Receding contact angle ( $\theta^{b2}$ )	
Example 1 of the present invention	88.2	39.8	55.3	15.5
Comparative Example 1	73.3	56.4	56.1	-0.3
Example 3 of the present invention	93.1	25.1	44.2	19.1
Comparative Example 2	86.9	52.0	51.8	-0.2

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: October 21, 2005

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